Material cycles and energy
Photosynthesis

Total mark – 16

Question: 1

1 Green plants make their own food.

1 (a) (i) What is the name of the process that plants use to make food?

[1 mark]

Draw a ring around the correct answer.

digestion **growth** **photosynthesis** **respiration**

1 (a) (ii) Plants need energy to make food.

Where does this energy come from?

[1 mark]

Draw a ring around the correct answer.

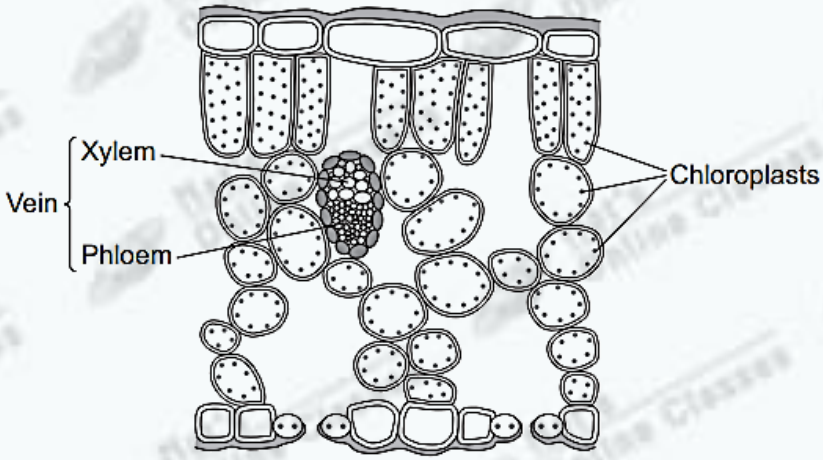
light **oxygen** **soil** **water**

1 (b) In plants, most of the food is made by the leaves.

Figure 1 shows a section through a plant leaf.

In the leaf, many of the cells contain chloroplasts.

Figure 1



1 (b) (i) Chloroplasts contain a green substance.

Name this green substance.

[1 mark]

_____

1 (b) (ii) How does this green substance help chloroplasts to make food?

[1 mark]

_____

_____

1 (b) (iii) What is the function of the vein shown in **Figure 1**?

[1 mark]

_____

_____

1 (b) (iv) Plants make glucose.

Name **two** substances a plant must take in to make glucose.

[2 marks]

1 _____

2 _____

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	photosynthesis		1	AO1 2.3
1(a)(ii)	light		1	AO1 2.3
1(b)(i)	chlorophyll	allow phonetic spelling	1	AO1 2.1.1b 2.3.1b
1(b)(ii)	traps / absorbs light **or** traps / absorbs energy	ignore provides energy ignore stores energy	1	AO1 2.1.1b 2.3.1b
1(b)(iii)	transport	ignore names of substances but do **not** allow large molecules – e.g. starch / protein do **not** allow energy allow support (of leaf)	1	AO1 2.2.2b
1(b)(iv)	carbon dioxide / CO_2 water / H_2O	in either order ignore light do **not** allow CO^2 / H^2O	1 1	AO1 2.3.1a/b
Total			**7**	

Question: 2

2 Substances travel from the soil into plant roots by different processes.

2 (a) One of these processes is osmosis.

What is the definition of osmosis?

[1 mark]

Tick (✓) **one** box.

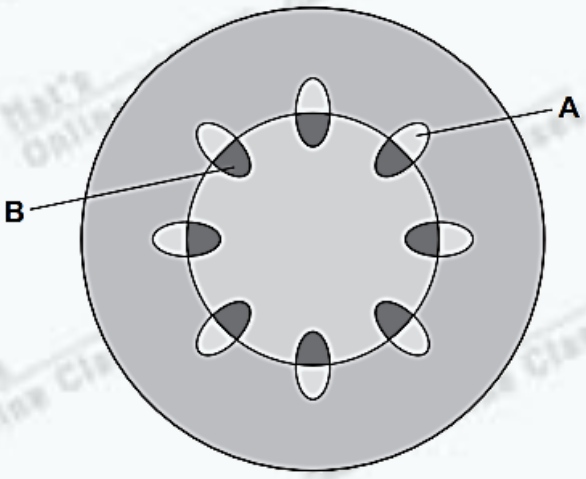
The movement of water from a concentrated solution to a more dilute solution through a partially permeable membrane. ☐

The movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane. ☐

The movement of water through a partially permeable membrane using energy. ☐

2 (b) **Figure 2** shows a cross-section through a plant stem.

Figure 2



Parts **A** and **B** in **Figure 2** contain tubes that transport materials in plants.

A student collected fluid from parts **A** and **B**.

The fluid from **A** contained a lot of sugar.

The fluid from **B** contained a lot of mineral ions.

What are the names of parts **A** and **B** in **Figure 2**?

[2 marks]

Use the correct answers from the box.

guard cells	**phloem**	**stomata**	**storage organ**	**xylem**

A _____

B _____

2 (c) In plants water moves from the roots, up through the stem and out of the leaves.

What is the name of this movement of water?

[1 mark]

Complete the sentence.

The _____ stream.

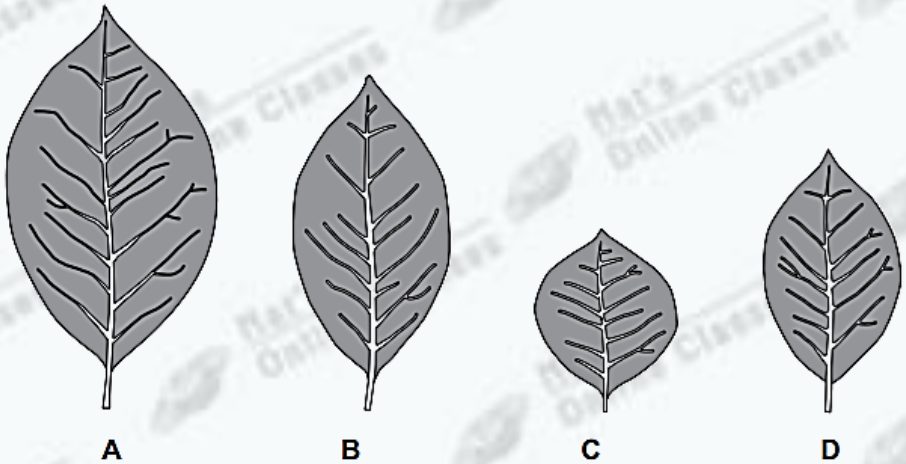
2 (d) The student investigated the rate of water loss from leaves.

The student:

- took four leaves, **A**, **B**, **C** and **D**, from the same plant
- measured the mass of each leaf
- kept the leaves in the same room for 3 hours
- measured the mass of each leaf again.

Figure 3 shows the four leaves she used.

Figure 3



2 (d) (i) How could the student calculate the mass of water lost for each leaf?

[1 mark]

Tick (✓) **one** box.

mass after ÷ mass before ☐

mass after × mass before ☐

mass before + mass after ☐

mass before − mass after ☐

2 (d) (ii) Suggest which leaf, **A**, **B**, **C** or **D**, lost the most water.

Give a reason for your answer.

[2 marks]

Leaf _____

Reason _____

_____

2 (d) (iii) The student changed the conditions in the room.

Suggest **two** conditions that would increase the rate of water loss from the leaves.

[2 marks]

1 _____

2 _____

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	The movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane.		1	AO1 3.1.1b
2(b)	**A** = phloem **B** = xylem		1 1	AO2 3.2.3a
2(c)	transpiration		1	AO1 3.2.3a
2(d)(i)	mass before – mass after		1	AO2 3.2.3a
2(d)(ii)	**A** has the largest surface area		1 1	AO2/3 3.1.3b/ d
2(d)(iii)	any **two** from: • hot / warm(er) • dry / drier • windy	allow turn on a heater / increase temperature allow turn on a fan	2	AO1 3.1.3d
Total			**9**	